

**UDA50 SUBSYSTEM RELIABILITY PROGRAM**

**USER'S MANUAL**

**PRELIMINARY**



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## **EMULEX PRODUCT WARRANTY**

**SOFTWARE WARRANTY:** Emulex warrants for a period of ninety (90) days, either from the date of installation or thirty (30) days after shipment, whichever comes first, that each software package supplied shall be free from defects and shall operate according to Emulex specifications under those Digital Equipment Corporation ("DEC"), IBM, Intel, and Unix, operating system versions supported by Emulex. Emulex does not warrant its software products under any operating system which has not been specifically identified. Any software revisions required hereunder will cover supply of distribution media only and will not cover on-site installation of integration.

**MEDIA WARRANTY:** (Return to Factory) - Media not covered by on-site warranty is warranted for thirty (30) days from date of shipment. The customer is responsible for return of media to Emulex and Emulex for freight associated with replacement media being returned to the customer.

**GENERAL TERMS:** The above warranties shall not apply to expendable components such as fuses, bulbs, and the like, nor to connectors and other items not a part of the basic product. Emulex shall have no obligation to make repairs or to cause replacement required through normal wear and tear or necessitated in whole or in part by catastrophe, fault or negligence of the user, improper or unauthorized use of the Product, or use of the Product in such a manner for which it was not designed, or by causes external to the Product, such as, but not limited to, power failure or air conditioning, Emulex's sole obligation hereunder shall be to repair or replace items covered in the above warranties. Purchaser shall provide for removal of the defective Product, shipping charges for return to Emulex, and installation of its replacement.

**RETURNED MATERIAL:** Warranty claims must be received by Emulex within the applicable warranty period. A replaced product, or part thereof, shall become the property of Emulex and shall be returned to Emulex at Purchaser's expense. All returned material must be accompanied by a RETURN AUTHORIZATION number assigned by Emulex.

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## Section One GENERAL DESCRIPTION

### INTRODUCTION

This manual describes the UDA50 Subsystem Reliability Program (ULMX9?) written and distributed by Emulex Corporation. This program supports Emulex Mass Storage Control Protocol (MSCP) host adapters and controllers and associated disk drives. This program also supports current MSCP host adapters or controllers which reside on the LSI-11 Bus or UNIBUS, such as the Digital Equipment Corporation (DEC) RQDX1 and UDA50 controllers. This manual is designed to help you use this program.

The manual is divided into four sections:

- |                      |  |
|----------------------|--|
| <b>Section One</b>   | <b>GENERAL DESCRIPTION:</b> This section describes the Emulex UDA50 Subsystem Reliability Program.   |
| <b>Section Two</b>   | <b>INVOKING THE PROGRAM:</b> This section describes how to invoke the UDA50 Subsystem Reliability Program.                                 |
| <b>Section Three</b> | <b>RUNNING THE PROGRAM:</b> This section describes how to use the UDA50 Subsystem Reliability Program.                                     |
| <b>Section Four</b>  | <b>TROUBLESHOOTING:</b> This section describes error messages that may appear while you are using the UDA50 Subsystem Reliability Program. |

### OVERVIEW

The Emulex UDA50 Subsystem Reliability Program verifies MSCP subsystem operation by an addressing test and a data reliability test. The addressing test verifies that the disk drive is formatted properly and that implied seek operations are functional. The data reliability test performs data storage and retrieval testing using an MSCP host adapter and a user-selected disk drive.

### FEATURES

The UDA50 Subsystem Reliability Program allows you to verify the operation of your MSCP-compatible subsystem.

## **COMPATIBILITY**

### **Software Compatibility**

The UDA50 Subsystem Reliability Program is an offline utility which operates under the XXDP+ Diagnostic Supervisor.

### **Hardware Compatibility**

The UDA50 Subsystem Reliability Program supports current MSCP-compatible controllers or host adapters which reside on the LSI-11 bus or UNIBUS.

The UDA50 Subsystem Reliability Program operates with any disk drive in an MSCP-compatible subsystem.

## Section Two INVOKING THE PROGRAM

### OVERVIEW

The methods for invoking the Emulex UDA50 Subsystem Reliability Program differ according to the media which the program is distributed on.

For instructions to invoke the UDA50 Subsystem Reliability Program that is supplied on Emulex PDP/LSI-11 Diagnostic Media, refer to the PDP/LSI Diagnostic Media User's Manuals for All Emulex Products (PX9950901), for Emulex Packaged Subsystem Products (PX9950902), or for Emulex Disk and Tape Products (PX9950903).

### NOTE

In these three cases, once you are operating under the XXDP+ Diagnostic Supervisor, you may enter a RUN command and the diagnostic name:

**.R U1MX9?**

For instructions to invoke the UDA50 Subsystem Reliability Program supplied with the Emulex SCSI Tape Utility (STU), refer to the SCSI Tape Utility Documentation Kit, PD9951901.

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## Section 3 RUNNING THE PROGRAM

### OVERVIEW

In this section, we use both text and facsimiles of terminal screen displays to describe how to use the software. The text shown at the top of a left-hand page describes the screen display shown at the top of the facing right-hand page; the text at the bottom of a left-hand page describes the screen display shown at the bottom of the facing right-hand page. This page format is used throughout this section.

In the sample dialogs between the software program and the user, your responses are highlighted in **boldface** print.

If an error message is displayed on your terminal screen while you are using any of these programs, consult Section 4, **TROUBLESHOOTING**.

## **RUNNING THE PROGRAM**

### **Starting the Emulex UDA50 Subsystem Reliability Program**

The Emulex UDA50 Subsystem Reliability Program announces itself as shown in the screen at the right.

The Emulex UDA50 Subsystem Reliability Program asks a series of questions to determine what type of test you want to run on which units.

In response to the "change hw" (change hardware) prompt, you should enter **N** and press **<return>**.

If you have enabled 22-bit memory addressing on your MSCP host adapter or controller, enter **Y** and press **<return>**.

The program displays the online/offline status of the MSCP units. Note that tape units are considered offline to MSCP. Enter the MSCP device number of the drive that you want to test, and press **<return>**.

The program asks you to select the mode of operation for the addressing test. If you enter the number 0 for the non-destructive mode, the diagnostic section of the disk will be tested. If you enter the number 1 for the destructive mode, the entire disk, including the user area, will be tested. Emulex recommends that you select the non-destructive mode.

EMULEX CORPORATION  
UDA50 SUBSYSTEM RELIABILITY PROGRAM (UDAREL)  
VERSION 1.0                      MARCH 16, 1983

CHANGE HW (L) ? **N**<return>  
USING 22-BIT ADDRESSING (Y OR N)? **Y**<return>

UNITS STATUS:

UNIT # 0 = ONLINE  
UNIT # 1 = OFFLINE  
UNIT # 2 = OFFLINE  
UNIT # 3 = OFFLINE  
UNIT # 4 = OFFLINE  
UNIT # 5 = OFFLINE  
UNIT # 6 = OFFLINE  
UNIT # 7 = OFFLINE

ENTER THE UNIT NUMBER(S) (0): **0**<return>  
ENTER MODE OF OPERATION (0 = NON-DESTRUCTIVE,  
1 = DESTRUCTIVE): **0**<return>

## **RUNNING THE PROGRAM**

### **AUTOMATIC TEST PROGRAM**

You may either run the tests of the Emulex UDA50 Subsystem Reliability Program using an Automatic Test Program (ATP) or using the Diagnostic Supervisor XXDP+. Emulex suggest that you use the Automatic Test Program in most cases. The commands used under the Diagnostic Supervisor are for troubleshooting or for instances other than initial testing.

The program asks if you want to use the Automatic Test Program. Enter Y and press <return>. In the non-destructive mode, the ATP usually takes about thirty seconds to complete.

At the end of the ATP, the system displays the number of units tested, the testing sequence, a comment that indicates when the testing has been completed, the number of passes made and the number of errors found.

If an error occurs which the program cannot correct, an error message and command information appears on the screen. The error messages are described in Section Four, TROUBLESHOOTING.

## RUNNING THE PROGRAM

ATP Y OR N ? Y<return>

TESTING UNIT 0  
01, 02

END OF PASS X ERROR TOTAL X

## **RUNNING THE PROGRAM**

### **DIAGNOSTIC SUPERVISOR COMMANDS**

**IP - Initialize Program:** This routine restarts the diagnostic program and initializes all the common test variables.

**SS - Select Switch Options:** This routine is used in conjunction with the Display Switch Option to enable various switches within the switch table. The routine is used whenever there is an absence of front panel switches on the chassis. When the command is entered, the switch option table displays on the CRT or prints to the line printer. To enable an option, enter the number that corresponds to the switch option and press <return>.

IP  
CHANGE HW (L) ? **N**<return>  
USING 22-BIT ADDRESSING (Y OR N) ? **Y**<return>  
UNITS STATUS  
ATP Y or N? **N**<return>

EXC>**SS**<return>

SS	Description	SS	Description
15	Halt On Error	14	Loop On Test
13	Inhibit Error Typeout	12	Not Used
11	Not Used	10	Ring Bell On Error
09	Loop On Error	08	Not Used
07	Not Used	06	Inhibit Data Compare
05	No Data Compare Typeout	04	Not Used
03	Not Used	02	Not Used
01	Not Used	00	Not Used

OPTIONS: **13,9,5**<return>

## **RUNNING THE PROGRAM**

**DS - Display Switch Options:** This routine displays the switch table, which describes the use for each switch currently being implemented. A sample switch table is shown in the screen at the right.

### **Changing Switch Options**

To change a selected switch option, enter the Select Switch Option command **SS**. Enter the number that corresponds to the option you want to change. Enter the Display Switch Option command **DS** to verify your switch option selections.



**EXC>DS<return>**

SS	Description	SS	Description
15	Halt On Error	14	Loop On Test
13	Inhibit Error Typeout	12	Not Used
11	Not Used	10	Ring Bell On Error
09	Loop On Error	08	Not Used
07	Not Used	06	Inhibit Data Compare
05	No Data Compare Typeout	04	Not Used
03	Not Used	02	Not Used
01	Not Used	00	Not Used

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0

**EXC>SS 13,5<return>**

**EXC>DS<return>**

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

## **RUNNING THE PROGRAM**

**SD - Select Test Drives:** This routine allows the user to specify the drives to be tested. To enable the Select Test Drive Option command, enter **SD** and the number(s) of the drives to be tested. Separate the drive numbers by commas, as shown in the screen on the facing page.

**SP - Start Program:** This routine starts to execute the diagnostic test sequence. This is the normal procedure to start the test program.

**AT - Select All Tests:** This routine initializes the test sequence table to include all the tests when execution of the diagnostic program starts.

**EXC>SD 0,1<return>**

**EXC>SP<return>**

**EXC>AT<return>**

## **RUNNING THE PROGRAM**

**LP - Enable Line Printer:** This routine enables the line printer as the output device.

**KB - Enable CRT/TTY:** This routine enables the CRT/TTY as the output device and disables the line printer (LP) as the output device. Usually used only when the LP has been previously selected as the output device.

**ST - Select Sequence Tests:** This routine allows the user to specify the sequence of the tests. To enable the Select Sequence Tests Option command, enter **ST** and the numbers that correspond to the tests. Separate the test numbers by commas, as shown in the screen on the facing page. Because this diagnostic only contains two tests, there should not be much need for this command.

**NT - Select No Tests:** This routine allows the user to specify any tests which he does not want to execute while the test program is running. To enable the Select No Tests Option command, enter **NT** and the numbers that correspond to the tests. Separate the test numbers by commas, as shown in the screen on the facing page.

**EXC>LP<return>**

**EXC>KB<return>**

**EXC>ST 1,2**

**EXC>NT 2**

## **RUNNING THE PROGRAM**

**SB - Set BREAKPOINT:** This routine provides the user with the ability to stop execution of the test program at any specified memory location. When that memory address reached, the test program halts and returns to the executive prompt. XXXXXX is the specific address you wish to stop at.

**CB - Clear Breakpoint:** This routine clears the previous breakpoint trap and restore the program code at the trap location. If you have **SB** and never reached the breakpoint, you must clear that breakpoint before setting another.

**LB - Loop Address On Breakpoint:** This routine gets the breakpoint address and also turns switch 8 ON. XXXXXX is the breakpoint address.

### **Special Commands**

The following commands normally are used only after the test program has been halted and only when examination and modification of specific parts of the memory are required.

**DM - Dump Memory:** This command displays the contents of the specified memory locations. SSSSSS is the starting memory location and EEEEE is the ending memory location.

**EXC>SB XXXXXX<return>**

**EXC>CB<return>**

**EXC>LB XXXXXX<return>**

**EXC>DM SSSSSS,EEEEEE<return>**

## **RUNNING THE PROGRAM**

**PM - Patch Memory:** This routine examines and/or modifies specified memory location contents. If it is desired to modify the data at that location, the operator simply types in the new data in octal followed by a terminator. If there is no new input, then the original data will remain unchanged. XXXXXX is the memory location to be patched.

Valid input terminators are as follows:

- CR** - End patching, return to command monitor
- LF** - Examine next sequential location of memory
- ^** - Examine previous memory location
- @** - Examine memory address that equals data examined

**GT - Go to Specific Address:** This routine causes the test program to go to the specified memory location. XXXXXX is the specific address.

**DR - Dump Registers:** This routine displays all the PDP-11 general register contents at the trap or halt condition.



**EXC>PM XXXXXX<return>**

**EXC>GT XXXXXX<return>**

**EXC>DR<return>**

**BLANK**

## **OVERVIEW**

This section explains the Emulex service policies and defines the software error messages that may appear while you are using the Emulex UDA50 Subsystem Reliability Program. This information is presented in the following order:

- Service
- Error Messages

## **SERVICE**

Emulex thoroughly tests our software programs. If a fault-isolation procedure indicates that the your Emulex UDA50 Subsystem Reliability Program software is not working properly, you must return the media to the factory or to an Emulex authorized repair center.

Before returning the product to Emulex, whether it is under warranty or not, you **must** contact the factory or the factory representative for return-shipment instructions and for a Return Materials Authorization (RMA) number.

**Do Not Return a Product to Emulex Without Authorization.** A product returned for service without an authorization will be returned to the owner at the owner's expense.

In the continental United States, Alaska, and Hawaii contact:

Emulex Technical Support  
3545 Harbor Boulevard  
Costa Mesa, CA 92626  
(714)662-5600 TWX 910-595-2521

Outside the United States, contact the distributor from whom the product was initially purchased.

To help you efficiently, Emulex or its representative requires certain information about the product and the environment in which it is installed. After you have received an RMA, package the product (preferably using the original packing material) and send the product **postage paid** to the address provided by the Emulex representative. The sender must also insure the package.

## TROUBLESHOOTING

### ERROR MESSAGES

The Emulex UDA50 Subsystem Reliability Program displays error messages if an error cannot be corrected by the software program. This section defines the error messages that may appear while you are using this program.

Table 4-1 lists and describes possible error messages that the Emulex UDA50 Subsystem Reliability Program may display if it detects an uncorrectable or hard error.

Table 4-1. Emulex UDA50 Subsystem Reliability Program Error Message Definitions

Error Message	Definition
Step 1 Didn't Appear Within 100 uSec After Hard Initialize	MSCP requires that the host adapter supplies the Step 1 data of the initialize sequence to the SA Register within 100 uSec of a Bus initialization. This error indicates that step was not accomplished.
Initialization Step Didn't Complete Within 10 Seconds	During the four steps of initialization, the host adapter is allowed 10 sec to complete the entire sequence. This error indicates one or more of those steps was not completed within that time.
Bit(s) Error In UDASA Register During Initialization	The Host System sends and receives certain bit patterns to the host adapter through the SA Register during initialization. This message indicates the Host received unexpected bit(s).

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Table 4-1. Emulex UDA50 Subsystem Reliability Program  
Error Message Definitions (continued)

Error Message	Definition
Reference Number Didn't Match with Command Packet	MSCP contains a unique command reference number. When the host adapter returns the end packet to the Host, the Host checks this number to see if it is the same. This message means it wasn't.
Response Packet Command Error On Set Controller Characteristics Command	Every command packet sent by host adapter could not successfully execute the set host adapter characteristics command.
Missed Response Packet Interrupt	The host adapter has a certain amount of time to respond to the command issued by the host. This message states that the host adapter did not respond in time.
Error On Writing Test Block(s)	The host adapter did not complete the write command with error free status.
Error On Reading Test Block(s)	Same as above, except that it applies to the read command.
Error On Comparing Host Data With Test Block(s)	When the data that was written was compared with the data in memory an error was found.
Controller Not Ready	The Host has read the SA register prior to issuing a command and found it to be non-zero. This means the host adapter is no longer ready.
No Free Command Descriptor	The Host attempted to issue a command to the host adapter, but found that the host adapter still owned the command ring slot it wanted to use.

continued on next page

## TROUBLESHOOTING

Table 4-1. Emulex UDA50 Subsystem Reliability Program  
Error Message Definitions (continued)

Error Message	Definition
UDA SA Register Not Zeros On Next Bus Cycle	Zeros must be present in the SA Register on the first bus cycle after a bus initialization. This indicates that the register did not contain all zeros.
Not Able To Bring Drive Online Please Attempt Re-Initialization	An error occurred during a read or write command, and the drive was taken offline, and the diagnostic could not bring it online again.
Bad Instruction Trap	Fatal Diagnostic Error that usually requires reload of the diagnostic.
Bad Interrupt Error Trap	A device did not interrupt to the proper vector.
Bad Timeout Error Trap	A timeout occurred somewhere in the diagnostic, usually requires reload of the diagnostic.
Data Compare Error At Block #	There was a miscompare between the data written and the data read.